UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

UNITED STATES OF AMERICA,

Plaintiff-Intervenor,

– v. –

COUNTRYWIDE HOME LOANS, INC., COUNTRYWIDE FINANCIAL CORPORATION, COUNTRYWIDE BANK, FSB, BANK OF AMERICA CORPORATION, BANK OF AMERICA, N.A., and REBECCA MAIRONE

Defendants.

Case No. 12-cv-1422 (JSR)

DECLARATION OF R. GLENN HUBBARD, Ph.D.

I, R. Glenn Hubbard, Ph.D., pursuant to 28 U.S.C. § 1746 and based on personal knowledge of the facts stated herein, declare as follows:

1. I am over the age of 18 and fully competent to testify to the facts in this declaration.

2. I have been retained as an expert by counsel to the entity defendants in the above-captioned matter. I provided an Expert Report, dated June 18, 2013.

3. The document attached to this Declaration as Exhibit A is a true and correct copy of my June 18, 2013 Expert Report. I incorporate that report herein by reference. My June 18, 2013 Expert Report accurately reflects my opinions on the matters discussed in that report.

4. As stated in the attached Exhibit A, I performed a number of regression analyses on the results of Mr. Holt's reunderwriting. The results of these analyses showed, among other things, that there was not a statistically significant increased likelihood that HSSL loans classified by Mr. Holt as "materially defective" to become seriously delinquent. In fact,

some of the defects identified by Mr. Holt made it less likely that a loan would become seriously delinquent. Ex. A at ¶¶ 52-57, Exs. 17A-D.

5. Mr. Holt has since submitted a revised report, based on the government's new definition of the HSSL process. I have re-run my analyses summarized in Exs. 17A-D of attached Exhibit A on this new data set. The results once again confirm that there is no statistically significant correlation between a loan being classified as materially defective by Mr. Holt and the likelihood that the loan will become seriously delinquent. Ex. B.[1]

I declare under penalty of perjury that the foregoing is true and correct. Executed on September 7, 2013.

R Glenn Hubbard

R. Glenn Hubbard, Ph.D.

[1] I understand that the Court's August 22, 2013, Order provides that the Defendants may submit amended expert reports on September 23, 2013. I expect to submit an amended expert report on that date and thus the revisions set forth in Exhibit B to this declaration should not be understood to be the entirety of the revisions I expect to make given the changes in the government's expert reports.

Exhibit A

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UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

UNITED STATES OF AMERICA,	)	
Plaintiff,	)	12 Civ. 1422 (JSR)
v.	)	ECF Case
COUNTRYWIDE FINANCIAL CORPORATION; COUNTRYWIDE HOME LOANS, INC.; COUNTRYWIDE BANK, FSB; BANK OF AMERICA CORPORATION; BANK OF AMERICA, N.A.; and REBECCA MAIRONE,	)	
Defendants.	)	

EXPERT REPORT OF ROBERT GLENN HUBBARD

June 18, 2013

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I. QUALIFICATIONS

1. My name is Robert Glenn Hubbard. I am the Dean of the Graduate School of Business at Columbia University, where I hold the Russell L. Carson Professorship in Finance and Economics. In addition, I am a Professor of Economics in the Department of Economics of the Faculty of Arts and Sciences. At the National Bureau of Economic Research, I am a Research Associate in programs on corporate finance, public economics, industrial organization, monetary economics, and economic fluctuations and growth. I am also a visiting scholar at the American Enterprise Institute in programs on tax policy and financial markets. Since 2006, I have been the Co-chair of the Committee on Capital Markets Regulation, a nonpartisan organization offering analyses and policy advice on financial regulation. Prior to joining the Columbia faculty as Professor of Economics and Finance in 1988, I taught in the Department of Economics at Northwestern University. I have also served as Visiting Professor of Business Administration at Harvard Business School, John M. Olin Visiting Professor at the University of Chicago, Visiting Professor and Research Fellow of the Energy and Environmental Policy Center at Harvard University's John F. Kennedy School of Government, and John M. Olin Fellow at the National Bureau of Economic Research. I hold A.M. and Ph.D. degrees in Economics from Harvard University, and B.A. and B.S. degrees in Economics from the University of Central Florida, *summa cum laude*.

2. My professional work has centered on problems in corporate finance, public economics, industrial organization, monetary economics, and natural resource economics. I have authored more than 100 publications, edited a number of books, and authored leading textbooks on money and financial markets, macroeconomics, and principles of

economics. I have examined issues relevant to financing and the macroeconomy and written on the recent financial crisis and the real estate market in particular.[1]

3. I have been an advisor or consultant to the Board of Governors of the Federal Reserve System, Congressional Budget Office, Federal Reserve Bank of New York, Internal Revenue Service, International Trade Commission, National Science Foundation, U.S. Department of Energy, and U.S. Department of the Treasury. From 1991 to 1993, I served as Deputy Assistant Secretary (Tax Analysis) of the U.S. Department of the Treasury, where I was responsible for economic analysis of tax policy, the administration's revenue estimates, and health care policy issues. From 2001 to 2003, I served as Chairman of the President's Council of Economic Advisers. Over that time period, I also served as Chair of the Economic Policy Committee for the Organization for Economic Cooperation and Development in Paris. A copy of my *curriculum vitae* is attached as Appendix A.

II. CASE BACKGROUND

4. Between January 2006 and December 2009, Countrywide's Full Spectrum Lending Division ("FSL") sold 249,459 loans to Fannie Mae and Freddie Mac (together, the "GSEs"). Certain of those loans were originated through the High Speed Swim Lane ("HSSL") process. Plaintiff claims that Countrywide used the HSSL process "[i]n order to increase the speed at which it originated and sold loans to the GSEs" and subsequently "eliminated every significant checkpoint on loan quality and compensated its employees based solely on the volume of loans originated, leading to rampant instances of fraud and

[1] *See*, for example, Hubbard, R. Glenn, and Christopher J. Mayer, "The Mortgage Market Meltdown and House Prices," *The B.E. Journal of Economic Analysis & Policy*, 9: Issue 3 (Symposium), Article 8, 2009.

other serious loan defects."[2] As described in the Expert Report of Plaintiff's Expert, Daniel McFadden, "[t]he alleged consequence of the HSSL is an increase in underwriting defects and reduction in experienced oversight that increased delinquency rates, taking into account market conditions and conventional measures of borrower risk."[3]

5. I understand the parties to the litigation disagree regarding the definition of HSSL loans. As provided in the Expert Report of Dr. Joseph Mason, Plaintiff defines HSSL loans as those approved between August 2007 and December 2009 at particular Countrywide processing centers and for which Countrywide's Automated Underwriting System ("AUS") variable has certain entries.[4] The Entity Defendants[5] define HSSL loans as those that were originated during the "pilot" period from August through September 2007 by specific "branches" at two processing centers, as well as loans that were originated under the subsequent rollout of the "Central Fulfillment" program by specific "branches" at four processing centers between October 2007 and April 2008. In addition, the Entity Defendants maintain that only those loans that did not involve a loan underwriter should be considered to have been originated through the HSSL process.[6] The definition of HSSL loans has a substantial impact on the number of loans at issue. Using Plaintiff's definition ("PHSSL"), the total HSSL loan count is 53,175, compared to 11,481 using the Entity Defendants' definition ("DHSSL").

6. Plaintiff's experts submitted a series of reports on May 7, 2013. Dr. Charles D. Cowan's

[2] United States of America v. Countrywide Financial Corporation *et al.*, Amended Complaint, January 11, 2013 ("Complaint"), ¶ 2.

[3] Corrected Expert Report of Daniel L. McFadden, June 6, 2013 ("Corrected McFadden Report"), ¶ 7.

[4] *See* Expert Report of Dr. Joseph R. Mason, May 7, 2013 ("Initial Mason Report"), ¶ 6 and Appendix C. Plaintiff's definition of HSSL requires the AUS field to equal Accept, Accept-DC, Accept-HIC, ECACC1, or ECACC2.

[5] The Entity Defendants are Countrywide Financial Corporation, Countrywide Home Loans, Inc., Countrywide Bank, FSB, Bank of America Corporation, and Bank of America, N.A.

[6] *See* Appendix B for additional details on the Entity Defendants' definition of HSSL loans.

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Expert Report describes the methodology by which Dr. Cowan selected a sample of 1,000 PHSSL and non-PHSSL loans to be re-underwritten by Mr. Ira H. Holt. Jr.[7] In his report, Dr. Cowan extrapolates Mr. Holt's re-underwriting results for the PHSSL sample loans to the broader population of PHSSL loans and conducts an analysis of the relationship between Mr. Holt's findings and loan performance. Mr. Holt's Expert Report describes the re-underwriting process and results for 865 of the 1,000 sample loans.[8,9] Mr. Holt's findings are captured by his characterization of each sample loan as either "Investment Quality with No Defects", "Investment Quality with Underwriting Violations", or "Materially Defective." Allegedly Materially Defective loans are those for which Mr. Holt "determined that a reasonable underwriter would likely conclude (1) that the deviation [from guidelines] increased the credit risk of the loan relative to a loan that complied with the guidelines or (2) that the increased risk was not offset by adequate and sufficiently documented strengths (or compensating factors)."[10] Dr. Daniel L. McFadden uses Mr. Holt's re-underwriting results to evaluate the relationship between loan performance and both alleged underwriting defects and the use of loan specialists for the sample loans.[11] On May 14, 2013, Dr. McFadden submitted *errata* detailing corrections to the Initial McFadden Report.[12] On May 28, 2013, he submitted a still more

[7] Expert Report of Charles D. Cowan, Ph.D., May 7, 2013 ("Cowan Report"), ¶ 5; Expert Report of Ira H. Holt, Jr., May 7, 2013 ("Holt Report"), p. 2.
[8] Holt Report, p. 16.
[9] Dr. Cowan explains the decision to review only 865 of the 1,000 sample loans (526 of the 600 HSSL sample loans and 339 of the 400 non-HSSL sample loans) as follows: "It is my opinion that, with the preliminary results from the first 526 loans and the nature of the review conducted to date, the continued review of the loans remaining with full loan files would not be productive. The defect rate in the properly weighted sample was over 30%, the defect rate for defaulted loans was at almost 50% (49.9%), and more than half of the materially defective loans had two or more material defects recorded. Accordingly, re-underwriting was terminated for both HSSL and non-HSSL loans." Cowan Report, ¶ 82.
[10] Holt Report, p. 18.
[11] Expert Report of Daniel L. McFadden, May 7, 2013 ("Initial McFadden Report").
[12] Errata to the May 7, 2013 Expert Report of Daniel L. McFadden, May 14, 2013 ("McFadden First Errata").

extensive correction to the Initial McFadden Report in which he revised his econometric models and presented both updated and new analyses.[13] On June 6, 2013, Dr. McFadden submitted further corrections to his May 28, 2013 filing,[14] as well as a revised report intended to incorporate the series of *errata* and corrections and entirely replace the Initial McFadden Report.[15] Dr. Joseph R. Mason submitted an initial report on May 7, 2013 followed by a revised report on May 31, 2013.[16] His report relies upon Mr. Holt's re-underwriting findings for the sample drawn by Dr. Cowan to calculate alleged losses suffered by the GSEs.[17]

III. ASSIGNMENT

7. Counsel for the Entity Defendants has asked me to:

   i. provide an overview of the macroeconomic conditions and residential real estate market prior to, during, and after the sale of the loans at issue, and describe how these conditions contributed, if at all, to mortgage delinquencies and defaults during that time period;

   ii. compare the performance of HSSL loans to that of non-HSSL loans sold to the GSEs by the Entity Defendants and to that of comparable loans sold to the GSEs by all lenders;

   iii. evaluate Dr. Cowan's analysis and, in particular, his extrapolation of Mr. Holt's re-underwriting findings from the loan samples to the broader

[13] Correction to the May 7, 2013 Expert Report of Daniel L. McFadden, May 28, 2013 ("McFadden First Correction").
[14] Correction to the May 7, 2013 Expert Report of Daniel L. McFadden, June 6, 2013 ("McFadden Second Correction"); Errata for Supplement to the May 7, 2013 Expert Report of Daniel McFadden, June 6, 2013 ("McFadden Second Errata").
[15] Corrected McFadden Report, Cover Page.
[16] Updated and Corrected Expert Report of Dr. Joseph R. Mason, May 31, 2013 ("Corrected Mason Report").
[17] Corrected Mason Report, ¶¶ 10, 12.

population of loans and his finding that the default rate is significantly higher for loans identified by Mr. Holt as materially defective;[18] and

iv. evaluate Dr. McFadden's analysis, including the relationship between Mr. Holt's defect findings and loan performance.

8. In working on this assignment, I have relied upon the documents and data listed in Appendix C. Others working under my supervision and direction have assisted me in this matter.

9. I am compensated at an hourly rate of $1,200 per hour for my time spent on this matter. In addition, I receive compensation based on the professional fees of those working under my supervision and direction. Payment for my work and those working under my supervision and direction on this matter is in no way contingent on the opinions I express or the outcome of this matter.

IV. SUMMARY OF OPINIONS

10. Based on my research and analyses to date, it is my opinion that the unanticipated and unprecedented deterioration in macroeconomic conditions that occurred from late 2006 through 2009 followed by a weak economic recovery caused a dramatic increase in mortgage delinquencies, defaults, and foreclosures:

i. Nationwide, home mortgage delinquencies and defaults began to increase in 2007, and continued to increase to unprecedented levels in subsequent years.

a. The total U.S. mortgage serious delinquency rate began increasing in early 2007 and continued to rise through the fourth quarter of 2009.[19] The rate

[18] Dr. Cowan includes loans that are 90 or more days delinquent in his "default" category. *See* Cowan Report, footnote 5. Note that there is a difference between delinquency and default because delinquent loans may return to a current status.

increased from 2.2 percent in the first quarter of 2007 to 9.7 percent in the fourth quarter of 2009. The U.S. subprime delinquency rate increased even more dramatically, from 8.3 percent in the first quarter of 2007 to 30.6 percent in the fourth quarter of 2009. While these rates have fallen since 2009, they remained high as of the end of 2012, with the U.S. mortgage serious delinquency rate at 6.8 percent and the U.S. subprime delinquency rate at 21.7 percent.

ii. Declines in house prices and worsening economic conditions caused industry-wide increases in defaults and delinquencies.

a. After peaking in June 2006, home prices nationwide declined by thirty percent as of December 2009. Home prices fell six consecutive years from 2006 through 2011, with a compound annual rate of decline of 6.4 percent per year. Prior to 2006, nationwide home prices had not fallen by more than 1.0 percent in a year and had never fallen in two consecutive years since 1945.

b. After declining through most of the period from 2004 through 2006, the national unemployment rate started to increase in the third quarter of 2007 and continued to increase through 2008 and 2009. Unemployment peaked in late 2009 at 9.9 percent and as of December 2012 was at 7.8 percent, still far above average levels over the last 30 years. Prior to 2009, one has to go back to 1984 to find a higher rate of unemployment in the U.S.

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[19] U.S. mortgage serious delinquency is defined as mortgage payments past due 90 or more days plus mortgage foreclosure inventory for all residential loan types. The rates "are calculated based on the number of loans serviced and not the dollar value." [Mortgage Bankers Association, National Delinquency Survey Facts, May 2008]

11. While there is strong evidence that macroeconomic factors, particularly declining house prices, caused nationwide home mortgage loan delinquencies and defaults, Plaintiff has claimed that Countrywide's alleged misrepresentations about its underwriting contributed to the performance of the HSSL loans. In order to determine the contribution, if any, that the alleged misrepresentations of the quality of Countrywide's underwriting may have had on the performance of the HSSL loans, I compare the performance of the HSSL loans to that of comparable non-HSSL loans, and to that of comparable loans sold to the GSEs by all lenders.[20] Had the HSSL loans been originated using poorer underwriting standards than those used for non-HSSL loans or loans originated by other lenders, one would expect the loans to have experienced a higher level of default and serious delinquency. In fact, just the opposite is true. I find that HSSL loans have performed as well as or better than non-HSSL loans both before and after accounting for the disclosed characteristics of the loans and macroeconomic conditions. This conclusion holds regardless of whether I use Dr. McFadden's logit model or my own panel logit model, and regardless of whether I use Plaintiff's definition of HSSL loans or the Entity Defendants' definition. In addition, I find that both PHSSL and DHSSL loans have performed better than comparable loans sold to the GSEs by all lenders, after controlling for disclosed loan characteristics and changes in macroeconomic conditions.

12. I have evaluated the analyses presented by Plaintiff's expert, Dr. Cowan. I find that he and Plaintiff's other experts omit analyses which he claims were integral to his sampling design and that are fundamental to the allegations at issue. In addition, his conclusion

[20] I define comparable non-HSSL loans and GSE loans as those loans with origination dates, FICO scores, and CTLV ratios that fall within the same ranges as the HSSL loans.

that loans identified as Materially Defective by Mr. Holt ("Holt Materially Defective loans") experience a higher level of default is flawed:

- Despite Dr. Cowan's purportedly careful design of a sample capable of assessing the relative defect rates of PHSSL and non-PHSSL loans, he and Plaintiff's other experts present defect rate estimates for PHSSL loans with no mention of defect rate estimates for non-PHSSL loans. In fact, according to Mr. Holt's re-underwriting findings, PHSSL loans have a *lower* defect rate than non-PHSSL loans.
- Dr. Cowan concludes that the default rate is significantly higher for Holt Materially Defective loans than Holt Non-Materially Defective loans. According to Mr. Holt, Materially Defective loans "deviated from the GSE Guidelines in a way that materially increased the credit risk of the loan[s]…."[21] However, Dr. Cowan fails to control for risk characteristics known to affect loan performance, such as credit scores and CLTV ratios, which Plaintiff's expert Dr. McFadden acknowledges are associated with default. In fact, Holt Materially Defective loans are riskier along many of these dimensions. Dr. Cowan's disregard of such factors renders his comparison of default rates essentially meaningless, as he fails to consider differences in disclosed risk characteristics between Holt Materially Defective and Holt Non-Materially Defective loans that are likely to affect default risk.

13. I have also evaluated the analyses presented by Plaintiff's expert, Dr. McFadden. I find that he, too, omits analyses relevant to the allegations at issue – namely, whether Holt

[21] Holt Report, p. 4.

Materially Defective loans are in fact associated with higher levels of default. His analysis simply fails to address this fundamental question.

- Dr. McFadden's regression models do not directly evaluate the relationship between Material Defects as identified by Mr. Holt ("Holt Material Defects") and loan performance. Instead, Dr. McFadden constructs an alternative defect measure which essentially alters Mr. Holt's defect findings in such a way that Dr. McFadden ensures he will find a statistically significant relationship between his altered defect findings and loan performance.[22] This measure both fails to capture the primary relationship of interest (that is, the relationship between Holt Material Defects and loan performance) and biases the results to give the inaccurate impression that Dr. McFadden has found a strong relationship between Mr. Holt's re-underwriting findings and the probability of serious delinquency.
- Dr. McFadden presents two regression models, a logit model and a duration model.[23] Using Dr. McFadden's own logit model, I find that there is only a marginally statistically significant relationship between Holt Material Defects and the probability of serious delinquency among all sample loans. I find that there is no statistically significant relationship between Holt Material Defects and the probability of serious delinquency for PHSSL loans in particular. Using Dr. McFadden's own duration model, I find that there is no statistically significant

[22] Hereinafter, I use the phrase "statistically significant" to indicate a statistically significant difference from zero at the 95 percent confidence level. I use the phrase "marginally statistically significant" to indicate a statistically significant difference from zero at the 90 percent confidence level. I use the phrase "strongly statistically significant" to indicate a statistically significant difference from zero at the 99 percent confidence level.

[23] The logit model estimates the relationship between loan performance and the explanatory variables (for example, loan characteristics and house prices) as of a single point in time, while the duration model captures period-by-period decisions by borrowers to prepay, remain current, or become delinquent or default as a function of the contemporaneous explanatory variables.

relationship between Holt Material Defects and the probability of serious delinquency for either all sample loans or for PHSSL loans in particular. These findings call into question the reliability of Mr. Holt's re-underwriting findings. Loans he identified as being Materially Defective, and therefore as allegedly having materially increased credit risk, are not statistically significantly more likely to default than Non-Materially Defective loans at the 95 percent confidence level, the confidence level standard set by Plaintiff's expert, Dr. Cowan. It would therefore be inappropriate to use Mr. Holt's findings to calculate losses because Plaintiff's experts have not adequately established that Mr. Holt has correctly identified defects that increased the risk of default (as he claims to have done based on his definition of Material Defects) or that the defects he has identified have caused losses for the HSSL loans.

- Related to the finding above regarding the potential unreliability of Mr. Holt's re-underwriting results, I find evidence of inconsistent judgment being applied by Mr. Holt's re-underwriters. If loans were assigned randomly to re-underwriters, or were assigned based on observable loan characteristics, one would expect to find consistency in the defect rates across re-underwriters after controlling for loan characteristics. I do not find this to be the case. Rather, after controlling for relevant loan and borrower characteristics, I find statistically significant differences in the defect rates across the members of Mr. Holt's re-underwriting team. Such inconsistencies further call into question the reliability of Mr. Holt's defect findings, and therefore also the reliability of the conclusions drawn by Plaintiff's other experts that were based on those findings.

- Dr. McFadden's "scenario analysis" is flawed and misleading. Dr. McFadden estimates the change in the count of seriously delinquent loans for the counterfactual scenario in which none of the PHSSL loans are either defective or approved by loan specialists. This scenario analysis suffers from the same issue described above, in that Dr. McFadden uses his alternative defect measure rather than Holt Material Defects in estimating the effect of defects on the number of seriously delinquent loans. In addition, Dr. McFadden's performance measure (if a loan was ever 90 days delinquent) does not measure whether losses will actually be incurred on those loans.

14. In the remainder of the report, I expand upon these opinions and provide the bases for them. In Section V, I provide an overview of the real estate market during the relevant time period. In Section VI, I describe my analysis comparing the performance of the HSSL loans to that of non-HSSL loans and loans sold to the GSEs by all lenders. In Section VII, I evaluate Dr. Cowan's analyses and in Section VIII, I evaluate Dr. McFadden's analyses.

V. OVERVIEW OF THE RESIDENTIAL REAL ESTATE MARKET

15. In this section, I describe the real estate market and mortgage market growth through mid-2006. I also provide an overview of the unprecedented decline that followed, with a collapse in real estate prices and a dramatic increase in the number of mortgage delinquencies, defaults, and foreclosures. In particular, I focus on the period after August

2007, the month both Plaintiff and the Entity Defendants identify as the start of the HSSL program.[24]

A. Home Price Appreciation and Growth in the Mortgage Market Industry

16. The years 2004 through 2006 were a period of significant growth in volume and values for both the residential real estate market and the primary and secondary mortgage markets. Residential real estate prices, as measured by the Case-Shiller Home Price Index, increased at a compound annual growth rate of 13.6 percent from January 2000 to June 2006, when prices peaked at more than double their 2000 values.[25] In comparison, from January 1990 to January 2000, prices grew at a compound annual rate of 2.0 percent (*see* Exhibit 1).

17. From 2002 to 2006, both interest rates and mortgage rates were low, which, as I have explained in my scholarly research, played a crucial role in home price appreciation.[26] As displayed in Exhibit 2, the effective federal funds rate remained within the range of approximately three to eight percent for the period from 1990 through 2000.[27] The

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[24] *See* Initial Mason Report, ¶ 6 and Appendix C. *See* Appendix B for the Entity Defendants' definition of HSSL loans.

[25] In the remainder of the report, when describing home prices, I refer to the Case-Shiller Composite (10) Home Price Index, which tracks monthly changes in the value of the residential real estate market in 10 metropolitan regions (Boston, Chicago, Denver, Las Vegas, Los Angeles, Miami, New York, San Diego, San Francisco, and Washington, D.C.). The index uses a value-weighted repeat sales pricing technique to measure changes in these housing markets. [Standard & Poor's, S&P/Case Shiller Home Price Indices Methodology, November 2009]

[26] *See* Hubbard, R. Glenn, and Christopher J. Mayer, "The Mortgage Market Meltdown and House Prices," *The B.E. Journal of Economic Analysis and Policy:* Vol. 9: Issue 3 (Symposium), Article 8, 2009, p. 12. [27] The federal funds rate is the interest rate banks charge each other for overnight loans. The interest rate that the borrowing bank pays to the lending bank to borrow the funds is negotiated between the two banks, and the weighted average of this rate across all such transactions is the effective federal funds rate. [Federal Reserve Selected Interest Rates (Daily) – H.15, available at http://www.federalreserve.gov/releases/h15/data.htm][28] Federal Reserve Selected Interest Rates (Daily) – H.15, available at http://www.federalreserve.gov/releases/h15/data.htm

[27] The federal funds rate is the interest rate banks charge each other for overnight loans. The interest rate that the borrowing bank pays to the lending bank to borrow the funds is negotiated between the two banks, and the weighted average of this rate across all such transactions is the effective federal funds rate. [Federal Reserve Selected Interest Rates (Daily) – H.15, available at http://www.federalreserve.gov/releases/h15/data.htm][28] Federal Reserve Selected Interest Rates (Daily) – H.15, available at http://www.federalreserve.gov/releases/h15/data.htm

federal funds rate dropped below two percent in December 2001, and remained at historically low levels until early 2005. In addition, rates for conventional 30-year mortgages generally fell during this time period and the prime interest rate decreased from 8.5 percent in January 2000 to a low of 4.0 percent in July 2003.[28] Lower interest rates and mortgage rates encouraged borrowers to either refinance their existing mortgages or to purchase a home (thereby increasing the demand for, and prices of, homes). As I have shown and discussed in my scholarly research, the effect of interest rates on house prices was an international phenomenon, with the decline in global, long-term real interest rates largely explaining the concurrent rise in property prices in developed countries.[29]

18. The increase in home prices during this period was accompanied by a market-wide increase in mortgage debt. As shown in Exhibit 3, aggregate mortgage debt outstanding in the United States increased from approximately $4.5 trillion in early 2000 to $9.9 trillion by the end of 2006.

B. Decline in Residential Real Estate Market Values and Macroeconomic Conditions

19. The U.S. economy and real estate market values deteriorated significantly from mid-2007 through 2009. Home prices fell precipitously, the unemployment rate increased, and

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[28] Federal Reserve Selected Interest Rates (Daily) – H.15, available at http://www.federalreserve.gov/releases/h15/data.htm

[29] *See* Hubbard, R. Glenn, and Christopher J. Mayer, "The Mortgage Market Meltdown and House Prices," *The B.E. Journal of Economic Analysis and Policy*: Vol. 9: Issue 3 (Symposium), Article 8, 2009, noting: ("It is important to understand the global context when considering the housing situation in the United States… Countries that experienced the highest rate of house price appreciation (Spain, France, the United States, Britain, and Australia) from 2001 to 2005 all had pronounced reductions in real mortgage rates" (p. 2); ("interest rate fluctuations must figure prominently in any explanation of movements in price/rent ratios") (Abstract).

mortgage delinquencies, defaults, and foreclosures subsequently increased.[30] While the magnitude and severity of the crisis was largely unexpected, the relationship between economic conditions (particularly house prices) and loan performance was well understood prior to the crisis.[31]

i. Decline in Real Estate Values

20. After peaking in June 2006, national home prices as measured by the Case-Shiller index started to decline, with a compound annual rate of decline of 4.4 percent through August 2007. From August 2007 to December 2009, the time period for when the loans at issue were originated, housing prices declined 26.3 percent, or a 12.3 percent compound annual rate. The market further declined by 7.4 percent between December 2009 and March 2012, but has since risen such that December 2012 housing prices are virtually the same as those in December 2009 (Exhibit 1).[32] The rise and subsequent decline in house prices were not unique to the United States. A number of other developed countries, including Britain, Spain, and Australia experienced similar collapses in residential real estate markets.[33]

21. The magnitude of this decline in house prices was unprecedented and unexpected by the market. As shown in Exhibit 4, prior to 2006 through 2011, house prices in the United States had not fallen for two consecutive years, and had not declined more than 1.0

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[30] For a general discussion of the link between the housing market and macroeconomic conditions, *see* Hubbard, R. Glenn, and Anthony Patrick O'Brien, *Economics*, Pearson, Fourth Edition, 2013, pp. 808-811. *See also*, Hubbard, R. Glenn, Anthony Patrick O'Brien, and Matthew Rafferty, *Macroeconomics*, Pearson 2011.
[31] *See* Ambrose, Brent, Charles Capone, and Yongheng Deng, "Optimal Put Exercise: An Empirical Examination of Conditions for Mortgage Foreclosure," *Journal of Real Estate Finance and Economics*, 23, 2001.
[32] Prices declined 7.4 percent from December 2009 to March 2012, but as of December 2012, prices are only 0.3 percent higher than December 2009 levels.
[33] Hubbard, R. Glenn, and Christopher J. Mayer, "The Mortgage Market Meltdown and House Prices," *The B.E. Journal of Economic Analysis and Policy:* Vol. 9: Issue 3 (Symposium), Article 8, 2009, pp. 1-2.

percent in any single year, since 1945. In 2007 and 2008, house prices fell 8.4 percent and 18.4 percent, respectively, followed by declines of 2.5 percent in 2009, 3.8 percent in 2010, and 3.7 percent in 2011.[34] Professor William Goetzmann and his coauthors note that, prior to the decline, most models of expected house prices forecasted low probabilities of a crash in the near future, stating: "*Ex post*, these models were completely wrong. *Ex ante*, however, there was no consensus of model failure, even among professional economists."[35]

22. Such relatively optimistic expectations are echoed in a December 2006 report published by the Office of the Chief Economist at Freddie Mac, which states: "Nationally, house prices will likely appreciate around the rate of consumer price inflation, although there is a potential for real declines and some hard-hit areas will need greater improvements in the local economy before experiencing a housing recovery. With smaller price gains and reduced opportunities to extract equity, mortgage debt will grow more slowly. In short, housing markets will move off center stage, but will resume quietly providing homes and opportunities to build a nest egg for millions of American households."[36] According to the testimony of Fannie Mae's corporate representative, Marianne Sullivan, "Fannie Mae, at this point in time [2007], did not believe… that it would be as significant as we actually did experience in terms of market declines."[37]

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[34] Following the format in which the data are reported, price declines for each year reflect the decline from the fourth quarter of the previous year to the fourth quarter of the given year.
[35] Goetzmann, William N., Liang Peng, and Jacqueline Yen, "The Subprime Crisis and House Price Appreciation," NBER Working Paper Series, September 2009.
[36] Nothaft, Frank, Amy Crews Cutts, Calvin Schnure, and Nela Richardson, "December 2006 Economic Outlook: Anatomy of a Housing Recovery," Office of the Chief Economist at Freddie Mac, December 8, 2006, p. 1.
[37] Deposition of Marianne Sullivan, June 10, 2013, pp. 75-76.

23. Falling home prices reduced homeowners' equity (*see* Exhibit 5).[38] According to a report by CoreLogic, a provider of financial and real estate data, as of the end of December 2012, 21.5 percent of all residential properties in the U.S. with a mortgage had negative equity.[39] With negative equity, borrowers owe more than the value of their property. The concept of "negative equity" is sometimes referred to as homes being "under water." When a borrower's home is "under water," the borrower's ability to refinance or take out a larger mortgage is reduced if not eliminated. It has long been understood that negative equity also reduces borrowers' incentives to continue making required mortgage payments, resulting in higher mortgage delinquency, default, and foreclosure rates.[40]

24. Exhibit 6 shows that the total U.S. mortgage serious delinquency rate began increasing in late 2006, and continued to rise through the fourth quarter of 2009 as house prices fell. The rate increased from 2.2 percent in the first quarter of 2007 to 9.7 percent in the fourth quarter of 2009 and remains historically high at 6.8 percent as of the end of 2012. The U.S. subprime delinquency rate[41] increased even more dramatically, from 8.3 percent in the first quarter of 2007 to 30.6 percent in the fourth quarter of 2009. At the end of 2012, the U.S. subprime delinquency rate was still historically high at 21.7 percent.

25. States that have experienced larger declines in housing prices have also experienced a larger percentage of seriously delinquent loans. As shown in Exhibit 7, for all loans in

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[38] Exhibit 5 reports aggregate household equity as a percentage of aggregate real estate assets. When the percentage falls below 50 percent, aggregate household debt exceeds aggregate household equity. However, this statistic does not account for the distribution of equity across households.

[39] CoreLogic, "CoreLogic Reports 200,000 More Residential Properties Return to Positive Equity in Fourth Quarter of 2012," March 19, 2013.

[40] Ambrose, Brent, Charles Capone, and Yongheng Deng, "Optimal Put Exercise: An Empirical Examination of Conditions for Mortgage Foreclosure," *Journal of Real Estate Finance and Economics*, 23, 2001.

[41] Data on delinquency rates is from the Mortgage Bankers Association National Delinquency Survey. The criteria used to categorize prime and subprime loans are based on survey participants' reporting of what they consider to be their prime or subprime servicing portfolio, since internal servicing guidelines vary. [National Delinquency Survey Facts, May 2008]

the United States by state, this relationship between house prices and loan delinquencies is apparent for the period from August 2007 through December 2012. In addition, a number of empirical studies have shown the importance of house price declines in explaining delinquencies and foreclosures.[42]

ii. Decline in Macroeconomic Conditions

26. The effect of declining home prices on mortgage delinquencies was compounded by increasing unemployment rates. After declining through most of 2004 through 2006, the national unemployment rate started to increase in the third quarter of 2007 and continued to increase through 2008 and 2009. Job loss is an important factor affecting a borrower's ability to pay his or her mortgage obligations. As illustrated in Exhibit 8, the U.S. mortgage serious delinquency rate increased contemporaneously with the unemployment rate. A study conducted by Freddie Mac on delinquent mortgage loans found that more than 40 percent of borrowers stated that unemployment (or reduced income) was the reason for the delinquency.[43] Exhibit 9 shows that, across all loans and all originators, states with larger increases in unemployment rates are experiencing higher rates of delinquency.

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[42] *See*, for example: Gerardi, Kristopher, Adam Hale Shapiro, and Paul S. Willen, "Decomposing the Foreclosure Crisis: House Price Depreciation versus Bad Underwriting," Federal Reserve Bank of Atlanta Working Paper 2009-25, September 2009 ("We find that had house prices not fallen, the foreclosure crisis would not have occurred, regardless of whether lenders had lowered underwriting standards (p. 25)"; Gerardi, Kristopher, Andreas Lehnert, Shane M. Sherlund, and Paul Willen, "Making Sense of the Subprime Crisis," Brookings Papers on Economic Activity, Fall 2008 ("We argue that the fall in home prices outweighs other changes in driving up foreclosures (p. 72)"; Demyanyk, Yuliya and Otto Van Hemert, "Understanding the Subprime Mortgage Crisis," *Review of Financial Studies*, 24, 2011, ("The most important macroeconomic factor is the subsequent house price appreciation, measured as the metropolitan statistical area (MSA) level house price change between the time of origination and the time of loan performance evaluation…The only variable in the considered proportional odds model that contributed substantially to the crisis is the low subsequent house price appreciation for vintage 2006 and 2007 loans (pp. 1848-1880)").

[43] Mortgage Bankers Association, Policy Paper 2007-1, "Suitability – Don't Turn Back the Clock on Fair Lending and Homeownership Gains," February 2007, p. 24. The study was based on a sample of loans originated in 1999-2005 and delinquencies were evaluated as of Q3 2006.

27. As I describe in the following section, the unprecedented collapse in the real estate market and overall economy contributed to losses experienced by the loans sold by Countrywide to the GSEs, regardless of whether they were originated under the HSSL loan program.

VI. ANALYSIS OF PERFORMANCE OF HSSL LOANS

28. In this section, I discuss the methodology and results of my analysis comparing the performance of the HSSL loans to that of comparable non-HSSL loans and comparable loans sold to the GSEs by all lenders. Before controlling for loan and borrower characteristics, I find that the serious delinquency rate for PHSSL loans is 9.2 percent, compared to 20.3 percent for non-PHSSL loans. Similarly, the serious delinquency rate for DHSSL loans is 13.7 percent, compared to a rate of 18.1 percent for non-DHSSL loans.[44] As I explain, it is important to control for differences in observable loan and borrower characteristics and changes in economic conditions when comparing the performance of different groups of loans. When I do so, I continue to find that the performance of the HSSL loans is better than or similar to that of non-HSSL loans and to that of loans sold to the GSEs by all lenders, regardless of whether I use Plaintiff's or the Entity Defendants' definition of HSSL loans.

29. I describe my analysis in detail in the following section. First, I describe various loan and borrower characteristics that have been found to explain differences in loan performance.

[44] I calculate the serious delinquency rate as the percentage of loans that were 90 or more days delinquent or liquidated as of December 2012. If instead, I calculate the serious delinquency rate using Dr. McFadden's measure (that is, the percentage of loans that were ever 90 days delinquent) and performance data, I find that the serious delinquency rate for PHSSL loans is 14.5 percent, compared to a rate of 31.1 percent for non-PHSSL loans. Similarly, using Dr. McFadden's measure, the serious delinquency rate for DHSSL loans is 21.5 percent, compared to a rate of 27.9 percent for non-DHSSL loans. The reason for these differences is that Dr. McFadden's performance measure does not account for the possibility that a loan that is at one point 90 days delinquent may prepay or return to a current or less delinquent status as of December 2012.

Second, I use Dr. McFadden's own logit regression model to compare the performance of HSSL and non-HSSL loans. Third, I develop an alternative model that, similar to Dr. McFadden's duration model, captures a borrower's monthly decision to default rather than modeling loan performance at a single point in time. I use this model (known as a panel logit model) to compare the performance of the HSSL loans to that of non-HSSL loans, and to that of loans sold to the GSEs by all lenders. Using either Dr. McFadden's logit model or my own panel logit model, I find that the performance of HSSL loans is similar to or better than that of comparable non-HSSL loans. Furthermore, using my own panel logit model, I find that the performance of HSSL loans is better than that of comparable loans sold to the GSEs by all lenders. These findings undercut Plaintiff's allegations regarding Countrywide's underwriting practices for HSSL loans.

A. Factors Impacting Loan Performance

30. Loan and borrower characteristics associated with the likelihood of delinquency or default affect loan performance. For example, all else being equal, a borrower with a lower credit score is more likely to become delinquent on a loan than a borrower with a higher credit score. In addition, differential economic conditions such as house prices and unemployment rates across geographical locations can impact loan performance. As such, simply comparing the default and delinquency behavior of two loans may be insufficient because the loans may have characteristics that would be expected to result in different performance.

31. In order to account for the factors affecting default and delinquency, a regression model can be used to estimate the relationship between loan performance (the "dependent variable") and a set of independent variables (also known as explanatory variables) that

are relevant predictors of performance.[45] As supported by academic research and a more detailed discussion in Exhibit 10, factors relevant for assessing risk and explaining default include equity in the home,[46] loan size, loan purpose (for example, for purchase or refinancing), origination year, debt-to-income ratio, credit score, loan documentation, residency (for example, primary residence versus second home), and property type (for example, single family versus condominium). These factors, as well as the macroeconomic factors identified above (that is, changes in house prices and unemployment rates) are among the independent variables used in my regression analysis.[47] Dr. McFadden recognizes the importance of each of these loan and borrower characteristics in explaining loan performance. His models include versions of all of these factors.

B. Comparison of HSSL and Non-HSSL Performance Using Dr. McFadden's Model

32. In his expert report, Dr. McFadden presents a series of regression models in which he estimates the relationship between loan performance, as measured by the occurrence of a 90+ day delinquency, and certain of Mr. Holt's defect findings as well as the use of loan specialists, while controlling for various loan and borrower characteristics and changes in house prices.[48] While not stated as a purpose of his analysis,[49] Dr. McFadden's

[45] It is common to refer to these independent variables as "controls" because they allow a researcher to take into account, or control for, differences between the pools or loans that are expected to impact performance.
[46] Equity is calculated as 100 percent minus the house-price-adjusted CLTV ratio. For example, if the house-price-adjusted CLTV ratio is 75 percent, equity is equal to 25 percent (100 minus 75 percent).
[47] For a complete description of the independent variables used in my regression models, *see* Exhibit 10.
[48] Dr. McFadden's model includes a house price ("HPI") variable that measures the "proportion change in the price of a representative single family home in that property's zip code during the year following loan origination." [Corrected McFadden Report, ¶ 16]
[49] Dr. McFadden describes his analysis as addressing the following questions: "Did underwriting defects generally lead to higher probabilities of delinquency?; Did permitting employees known as 'loan specialists' to approve loans as 'cleared to close' increase the probability of loan delinquencies?; [and] Did underwriting defects and the use of

regression models can also be used to compare the performance of HSSL and non-HSSL loans. Given the models' capability to address this question, and the fact that this question is fundamental for evaluating the allegations at issue, it is surprising that Dr. McFadden omits any discussion of the relative performance of HSSL and non-HSSL loans.

33. In order to assess the relative performance of PHSSL and non-PHSSL loans, I re-estimate the first model reported in Table 7 of the Corrected McFadden Report, but exclude the defect count variables ("1 Categ. Underwriting Prob." and "2+ Categ. Underwriting Prob.") and expand the set of observations to include the population of PHSSL and non-PHSSL loans rather than restricting the observations to the sample loans. Hypothetically, to the extent PHSSL and non-PHSSL loans have different defect rates, and to the extent the presence of defects affects loan performance, the defect count variables may explain part of the difference in the relative performance of PHSSL and non-PHSSL loans. By excluding the defect count variables from the model, I am able to isolate the difference in performance, controlling for loan and borrower characteristics and changes in house prices, in the estimated coefficient for the "PHSSL" variable. As reported in Exhibit 11A, the estimated coefficient on the PHSSL variable is negative, indicating that PHSSL loans are less likely to become delinquent than non-PHSSL loans. This difference in relative performance is strongly statistically significant (*p*-value of 0.003). I perform the same analysis using the Entity Defendants' definition of HSSL loans and find the estimated coefficient on the DHSSL variable is positive. However, this coefficient is not statistically significant (*p*-value of 0.119) (*see* Exhibit 11B).

'loan specialists' lead to higher probabilities of delinquency specifically among HSSL loans?" [Corrected McFadden Report, ¶ 8]

34. Thus, contrary to Plaintiff's claim, Dr. McFadden's own logit model establishes that the likelihood of delinquency is, if anything, lower for HSSL loans than for non-HSSL loans, after controlling for loan and borrower characteristics and changes in house prices.

C. Comparison of HSSL and Non-HSSL Performance Using Alternative Model

35. Another approach for evaluating the relative performance of HSSL and non-HSSL loans is to estimate a dynamic rather than static logit model. In the loan performance setting, a dynamic choice model, such as a duration or panel logit model,[50] captures period-by-period decisions by borrowers to prepay, remain current, or become delinquent or default.[51] In contrast, Dr. McFadden's logit model only considers loan performance at a single point in time. Dr. McFadden estimates a duration model as well and acknowledges the benefits of duration models and the fact that these models have been commonly used in similar settings: "Earlier proceedings on similar matters have used duration models to determine the probabilities that loans will reach delinquent status at each duration after date of origination. This model is appropriate when the loans have very different dates of origination, and where the data terminate before a substantial number of delinquencies are realized."[52] The conditions Dr. McFadden describes apply to the loans considered

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[50] Duration and panel logit models yield virtually equivalent results when the observations occur at sufficiently short time intervals. *See* Allison, Paul D., "Discrete-Time Methods for the Analysis of Event Histories", *Sociological Methodology*, Vol. 13, 1982, p. 73: "In practice, however, the difference between the two models is likely to be trivial. The smaller the time interval, the smaller the difference will be because as the interval width becomes smaller, the logistic [panel logit] model converges to the proportional hazards [duration] model."

[51] *See*, for example, *Handbook of Econometrics, Volume II,* Edited by Z. Griliches and M.D. Intriligator, Elsevier Science Publishers, "Chapter 24: Econometric Analysis of Qualitative Response Models", Daniel L. McFadden, p. 1433: "Dynamic models: Many important economic applications of qualitative response models involve observations through time, often in a combined cross-section/time-series framework."; *see also* Agarwal, Sumit, Brent W. Ambrose, Souphala Chomsisengphet, and Chunlin Liu, "An empirical analysis of home equity loan and line performance," *Journal of Financial Intermediation*, 15, 2006, p. 450: "[T]he standard approach in empirical mortgage modeling recognizes the ability of the borrower to terminate the mortgage through either prepayment or default in a competing risks hazard framework."

[52] Corrected McFadden Report, ¶ 29.

here, which were originated between January 2006 and November 2009, with a significant portion not becoming seriously delinquent prior to December 2012. Duration models allow one to capture the contemporaneous relationship between loan performance and time-varying economic factors.[53]

36. The panel logit model I develop here estimates the probability of default and prepayment in each month for each loan, conditional on neither event having occurred in a previous month, accounting for disclosed loan characteristics and economic conditions such as house prices and unemployment rates in that month. The dependent variable reflects one of three possible loan statuses: prepaid, current, or serious delinquency.[54] I obtain loan characteristics data from Countrywide. These characteristics (that is, the controls or independent variables in my regression analysis) include documentation type, credit score, CLTV ratio, debt-to-income ratio, original loan balance, property type, loan purpose, occupancy type, and origination year. In addition, my analysis controls for changes in economic conditions by including the estimated equity in the homes and the change in the unemployment rate as independent variables. Exhibit 12 provides definitions for each of the variables in my regression analysis. I chose the independent variables based on academic research examining the riskiness of loans and predictors of default. Dr. McFadden includes a very similar set of variables in his regression analyses.

37. Using this model, I estimate the relationship between loan performance and loan and borrower characteristics and macroeconomic conditions for the non-HSSL loans. I use

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[53] *See*, for example, *Structural Analysis of Discrete Data and Econometric Applications*, Edited by Charles F. Manski and Daniel L. McFadden, Cambridge: The MIT Press, 1981, "Chapter 3: Statistical Models for Discrete Panel Data", James J. Heckman, p. 114: "The [dynamic] model is sufficiently flexible to accommodate time-varying explanatory variables…and complex structural economic interrelationships among decisions taken at different times."

[54] Serious delinquency is measured as a loan being 90 days delinquent or more, or liquidated.

those estimated relationships to predict the performance of the HSSL loans. I then compare the predicted performance to the actual performance of HSSL loans as of December 2012. As I describe below, using either definition of HSSL loans, I find that the performance of the HSSL loans is not statistically different from that of non-HSSL loans.

i. Benchmarking HSSL Performance Against Non-HSSL Performance

38. As introduced above, my regression model estimates the relationship between loan performance (that is, the occurrence of serious delinquency and default, or prepayment) and loan characteristics and macroeconomic conditions for the population of non-HSSL loans.

39. Exhibit 13-A1 reports the regression results showing the estimated impact of loan and borrower characteristics on loan performance for non-PHSSL loans. Exhibit 13-A2 demonstrates how the likelihood of default is affected by changes in the unemployment rate and housing prices (as captured by the equity variable).[55] Exhibits 13-B1 and 13-B2 report the estimated relationships for non-DHSSL loans.

40. I use the coefficients from the model estimated using the non-HSSL loans to calculate what I term the "expected" default rates for the HSSL loans. This measure can be thought of as the expected performance of the HSSL loans, assuming they performed like the non-HSSL loans, after controlling for loan characteristics and changing economic conditions. I then aggregate the expected performance of each loan to arrive at the expected performance for the entire population of HSSL loans. If the HSSL loans have a

[55] Equity and unemployment are highly correlated (that is, related), making it difficult to simultaneously estimate the effects of both variables on loan performance. Creating indicator variables by quartiles of equity and unemployment is an alternative way to estimate the relationship between macroeconomic conditions and loan performance.

lower cumulative default rate than expected, it indicates that the HSSL loans performed better than the non-HSSL loans, given their characteristics.

41. I find an expected default and serious delinquency rate of 9.2 percent for the PHSSL loans, based on the performance of the non-PHSSL loans. The actual default and serious delinquency rate for PHSSL loans as of December 2012 is 9.0 percent. The difference between actual and expected performance is not statistically significant. I therefore conclude that the performance of the PHSSL loans is on par with that of the non-PHSSL loans, after controlling for loan characteristics and changes in economic conditions. For DHSSL loans, the expected default and serious delinquency rate is 13.3 percent. The actual default and serious delinquency rate for DHSSL loans is 13.5 percent. The difference between actual and expected performance is not statistically significant.

ii. Benchmarking HSSL Performance Against Performance of Loans Sold to GSEs by All Lenders

42. Another relevant comparison group is loans sold to the GSEs by all lenders. In order to evaluate the performance of the HSSL groups relative to this benchmark, I use the same panel logit model as described above. I estimate the relationship between loan performance and loan and borrower characteristics and macroeconomic conditions for the comparable loans sold to the GSEs by all lenders.[56] I use those estimated relationships to predict the performance of the HSSL loans. I compare the predicted performance to the actual performance of HSSL loans as of December 2012. As I describe below, using

[56] Data on comparable loans come from CoreLogic. I am unable to identify HSSL loans in the CoreLogic database. However, these loans comprise, at most, only approximately 8 percent of the GSE loans included in the benchmark using Plaintiff's definition and, at most, only approximately 2 percent using the Entity Defendants' definition. For a complete description of the identification of comparable loans, *see* Exhibit 12.

either definition of HSSL loans, I find that HSSL loans have performed better than comparable loans sold to the GSEs by all lenders.

43. Exhibit 14A reports the regression results showing the estimated impact of loan and borrower characteristics on loan performance for loans sold to the GSEs by other lenders. Exhibit 14B demonstrates how the likelihood of default is affected by changes in the unemployment rate and housing prices.

44. I use the coefficients from the model estimated using the loans sold to the GSEs by all lenders to calculate what I term the "expected" default rates for the PHSSL and DHSSL loans. I find an expected default and serious delinquency rate of 10.0 percent for the PHSSL loans, based on the performance of the GSE loans. The difference between the actual default and serious delinquency rate for PHSSL loans of 9.0 percent as of December 2012 and expected performance is statistically significant. Similarly, I find an expected default and serious delinquency rate of 14.6 percent for the DHSSL loans, compared to an actual default and serious delinquency rate of 13.5 percent as of December 2012. Again, this difference is statistically significant. I therefore conclude that, regardless of the definition I use, the performance of the HSSL loans is better than that of loans sold to the GSEs by all lenders, after controlling for loan characteristics and changes in economic conditions.

VII. EVALUATION OF DR. COWAN'S ANALYSIS

45. In his report, Dr. Cowan describes his methodology for selecting the sample of loans to be re-underwritten by Mr. Holt. I understand Dr. Barnett evaluates Dr. Cowan's methodology and its implications in his report. In brief, Dr. Cowan stratified the population of loans by four variables (PHSSL, default, LTV, and FICO score), selected a

sample of 1,000 loans disproportionately from these strata, and passed the loans onto Mr. Holt for re-underwriting.[57] Mr. Holt's team of re-underwriters reviewed a total of 865 of these 1,000 sampled loans. Dr. Cowan then used Mr. Holt's results to draw various conclusions about the population of loans. As I describe below, Dr. Cowan's conclusions are flawed and/or incomplete in a number of ways.

A. Dr. Cowan and Plaintiff's other experts fail to test whether HSSL loans have a higher Material Defect rate than non-HSSL loans

46. Dr. Cowan describes his selection of separate samples from the PHSSL and non-PHSSL loan populations as allowing him "to draw accurate conclusions about the underwriting quality of the loans in the HSSL program and to compare it against the underwriting practices outside the HSSL program."[58] Similarly, he states that "[t]he reasoning behind stratification based on HSSL, Default, and LTV is to make reasonable and justifiable comparisons between the findings of the re-underwriting comparing similar HSSL/Non-HSSL clusters of loans, e.g., defective rate for HSSL-Default-LTV<80% loans vs. defective rate for Non-HSSL-Default-LTV<80% loans."[59] It is therefore surprising that Dr. Cowan and Plaintiff's other experts entirely omit any such comparisons from their reports.

47. Using Mr. Holt's re-underwriting results, I have made such a comparison.[60] Specifically, I compare the overall defect rates of PHSSL and non-PHSSL loans as well as the defect rates of paired PHSSL and non-PHSSL strata (for example, I compare the defect rate for

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[57] Cowan Report, ¶ 5.
[58] Cowan Report, ¶ 5.
[59] Cowan Report, ¶ 50.
[60] As I note above, Mr. Holt only reviewed 865 of the 1,000 sample loans selected by Dr. Cowan. Dr. Cowan provides no support that his findings would be unchanged had Mr. Holt reviewed all 1,000 sample loans. For the purpose of this analysis, I compare the defect rates for the 865 sample loans re-underwritten by Mr. Holt.

defaulted PHSSL loans with LTV ratios less than 80 percent to that for defaulted non-PHSSL loans with LTV ratios less than 80 percent). My results are shown in Exhibit 15. First, I find that the overall defect rate of PHSSL loans (30.8 percent, properly weighted to account for Dr. Cowan's stratification by default status, LTV ratio, and FICO score)[61,62] is statistically significantly *less than* the defect rate of non-PHSSL loans (40.0 percent, properly weighted to account for Dr. Cowan's stratification by default status, LTV ratio, and FICO score).[63] Second, I find that, within paired strata, there are no statistically significant differences in the defect rates of PHSSL and non-PHSSL loans. In the two cases in which the difference in defect rates is the closest to being statistically significant (Cowan Strata 3 & 4 and Cowan Strata 7 & 8), the defect rate of non-PHSSL loans is higher. Thus, the evidence demonstrates that PHSSL loans are in fact less likely than non-PHSSL loans to be Materially Defective based on Mr. Holt's review.

B. Dr. Cowan's finding that the default rate is significantly higher for Holt Materially Defective loans is fundamentally flawed

48. Dr. Cowan goes on to analyze Mr. Holt's results "to determine whether a relationship exists between defects and default rates" in the sample of HSSL loans.[64] Dr. Cowan

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[61] For example, the percentage of defaulted loans with an LTV ratio less than 80 percent and for which the FICO score is in the lowest stratum (that is, a FICO score between 506 and 616) is 1.5 percent in the population of PHSSL loans. I multiply Mr. Holt's estimated defect rate for the sample loans in this stratum by a weight of 1.5 percent when aggregating defect rates across strata to calculate the estimated overall defect rate in the PHSSL population.

[62] My estimated defect rate of 30.8 percent differs slightly from that reported by Dr. Cowan (30.6 percent). [Cowan Report, ¶ 72] This difference occurs because Dr. Cowan assumes the distribution of FICO scores among the sample loans is proportional to the distribution among the population of loans. In fact, the lower and upper bounds for the FICO score quintiles do not create exactly equally sized categories and the fact that Mr. Holt did not review the full sample of 600 PHSSL loans exacerbates the disproportionality. My estimated defect rate takes into account the disproportional nature of the sample by adjusting the weights applied to the defect rates within each of the stratum.

[63] I compared the defect rates of PHSSL and non-PHSSL loans using a *z*-test of equality.

[64] Cowan Report, ¶ 73.

concludes that "[t]he default rate is significantly higher for materially defective loans" in the PHSSL sample and that the difference is statistically significant.[65]

49. Dr. Cowan's analysis is fundamentally flawed because he fails to consider known risk characteristics that may be responsible for the relationship between Holt Material Defects and loan performance that he observes in the data. As discussed above, it is well known that certain loan and borrower characteristics (for example, CLTV ratios, DTI ratios, FICO scores, loan amounts, and so on) affect loan performance. Plaintiff's expert Dr. McFadden recognized as much in his report, as he included these variables and many others in his econometric model of loan performance.[66]

50. To evaluate whether the same risk characteristics that are associated with default are also associated with Holt Material Defects, I compare the characteristics of Holt Materially Defective loans to the characteristics of Holt Non-Materially Defective loans. I report these comparisons in Exhibit 16. I find that, on average, Holt Materially Defective loans have larger principal balances, higher CLTV ratios, higher DTI ratios, and lower FICO scores. They are also more likely to be investment properties.[67] In other words, Holt Materially Defective loans have riskier characteristics than Holt Non-Materially Defective loans.

51. Thus, it is no surprise that the Holt Materially Defective loans have a higher default rate. Dr. Cowan's disregard of such factors renders his comparison of default rates essentially meaningless, as he fails to consider differences in disclosed risk characteristics between Holt Materially Defective and Non-Materially Defective loans that are likely to affect

[65] Cowan Report, ¶¶ 76-77. Dr. Cowan tests for statistical significance using a Chi-square test.
[66] Corrected McFadden Report, ¶ 19 and Table 7.
[67] All these differences are statistically significant at the 95 percent confidence level.

default risk. As I describe below, when I properly control for factors affecting loan performance, I find, if anything, only a marginally statistically significant relationship between Holt Material Defects and the probability of serious delinquency among all sample loans. For PHSSL loans in particular, I do not find a statistically significant relationship between Holt Material Defects and the probability of serious delinquency.

VIII. EVALUATION OF DR. MCFADDEN'S ANALYSIS

A. Dr. McFadden fails to directly evaluate the relationship between Holt Material Defects and loan performance

52. As described above, Dr. Cowan's analysis of the difference in default rates for Holt Materially Defective versus Holt Non-Materially Defective loans fails to properly account for loan and borrower characteristics that affect loan performance. While Dr. McFadden's analysis controls for risk characteristics, he fails to directly evaluate the impact of Holt Material Defects on loan performance. Instead, Dr. McFadden takes a circuitous and ultimately misleading approach. He first tests which of Mr. Holt's nine Agency Defect categories increases the probability of serious delinquency (*see* Corrected McFadden Report, Table D2).[68] In the regressions reported in Table 7 of Dr. McFadden's report, he only considers the five Agency Defects for which he finds a positive relationship between the defect category and the probability of serious delinquency when calculating the count of defects for each loan (the "1 Categ. Underwriting Prob." and "2+ Categ. Underwriting Prob." defect count variables).[69] His

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[68] Mr. Holt's Agency Defect categories are Documentation Defects, Misrepresentation Defects, Eligibility Defects, Property Eligibility Defects, Property Defects, AUS Defects, Income Defects, Credit Defects, and Asset Defects. *See* Corrected McFadden Report, Appendix D and Holt Report, p. 18.

[69] The five Agency Defects included in Dr. McFadden's defect count variables are Misrepresentation Defects, Property Eligibility Defects, AUS Defects, Income Defects, and Credit Defects.

conclusions regarding the impact of Mr. Holt's defect findings on loan performance are based on the estimated coefficients for these defect count variables rather than on a direct test of the relationship between Holt Material Defects and serious delinquency.

53. This approach ensures the analysis will be biased in favor of finding a positive relationship between Dr. McFadden's subset of defects and serious delinquency because it excludes by construction the defects identified by Mr. Holt that are not positively associated with delinquency. This approach is similar to a student getting 50 questions wrong out of 100 and deciding in determining his grade to only count the questions he got right so that he could claim a score of 50 out of 50.

54. In fact, Dr. McFadden's analysis *confirms* that some of the defects identified by Mr. Holt (Documentation Defects, Property Defects, and Asset Defects) have a *negative* effect on the probability of serious delinquency and that nearly all of the defects identified by Mr. Holt (all except Automated Underwriting System ("AUS") Defects) are not statistically significantly related to the probability of serious delinquency at the 95 percent confidence level.[70] Dr. McFadden finds that four of Mr. Holt's Agency Defects (Misrepresentation Defects, Property Eligibility Defects, AUS Defects, and Credit Defects) have a positive and statistically significant relationship with serious delinquency at the 90 percent confidence level.

55. Dr. McFadden's approach creates a fundamental inconsistency between his own defect measures and Mr. Holt's re-underwriting findings. For example, there are instances where Mr. Holt identifies a loan as being Materially Defective, while Dr. McFadden's

[70] I understand Dr. Mason uses Mr. Holt's Material Defect findings to calculate losses despite the fact that Dr. McFadden has shown that a subset of Mr. Holt's Agency Defect findings are not, in fact, positively correlated with the probability of serious delinquency, let alone statistically significantly related to serious delinquency.

count of defects for the loan is equal to zero.[71] This discrepancy arises because there are loans with Documentation, Property, Eligibility, or Asset Defects (and none of the five Agency Defects considered by Dr. McFadden) that are found to be Materially Defective by Mr. Holt. Dr. McFadden, however, excludes these categories from his defect count measures. Similarly, there are loans with the Agency Defects Dr. McFadden finds to be positively and at least marginally statistically significantly correlated with serious delinquency (Misrepresentation Defects, Property Eligibility Defects, AUS Defects, and Credit Defects) that are not identified as Material Defective by Mr. Holt.[72] Thus, Plaintiff's own experts disagree on which defects are in fact "material" to the credit risk of the loans.

56. To directly assess the impact of Holt Material Defects on the probability of serious delinquency and to illustrate the misleading nature of Dr. McFadden's analysis, I adjust Dr. McFadden's regression models by replacing the defect count variables with a material defect flag based on Mr. Holt's re-underwriting findings. I make no other changes to the data or to Dr. McFadden's regression models. Exhibits 17A and 17B report my results. Using Dr. McFadden's logit model, I find a positive, but only marginally statistically significant coefficient (*p*-value of 0.069) on the material defect variable (*see* Exhibit 17A). Using Dr. McFadden's duration model, I find a positive, but statistically insignificant coefficient (*p*-value = 0.110) on the material defect variable (*see* Exhibit 17B). Dr. McFadden acknowledges the appropriateness of a duration model for

[71] Data provided as backup to Holt Report, "2013.05.02 Final Data File.csv." My evaluation is based on the Agency Defect flags ("Agency_1", "Agency_2", etc.) and the Holt Material Defect flag ("IQ").
[72] *Id.*

this application,[73] and as discussed above, academic researchers consider a duration model to be a standard approach in the loan performance setting.[74] These results indicate that there is not a statistically significant relationship between Holt Material Defects and the occurrence of serious delinquency at the confidence level standard set by Plaintiff's expert, Dr. Cowan (that is, the 95 percent confidence level).

57. I also use Dr. McFadden's models to evaluate the relationship between Holt Material Defects and loan performance for PHSSL loans in particular by adding interaction terms between the PHSSL variable and the material defect variable. As shown in Exhibit 17C, using Dr. McFadden's logit model, I find a positive, but statistically insignificant coefficient (p-value = 0.363) on the interaction term between PHSSL and material defect ("PHSSL and Material Defect"). Similarly, using Dr. McFadden's duration model, I find a positive, but statistically insignificant coefficient (p-value = 0.207) on the interaction term between PHSSL and material defect (*see* Exhibit 17D). Therefore, regardless of which of Dr. McFadden's regression models I use, I find that there is not a statistically significant relationship between Mr. Holt's material defect findings and the probability of serious delinquency for PHSSL loans.

B. Dr. McFadden's regression models and my analysis of defect rates across re-underwriters suggest that Mr. Holt's re-underwriting findings are unreliable

58. These findings call into question the reliability of Mr. Holt's re-underwriting results. Loans he identified as being Materially Defective, and therefore as allegedly having materially increased credit risk, are not statistically significantly more likely to become

[73] Corrected McFadden Report, ¶ 29.

[74] *See*, for example, Agarwal, Sumit, Brent W. Ambrose, Souphala Chomsisengphet, and Chunlin Liu, "An empirical analysis of home equity loan and line performance," *Journal of Financial Intermediation*, 15, 2006, p. 450.

seriously delinquent than Non-Materially Defective loans at the 95 percent confidence level, the confidence level standard set by Plaintiff's expert, Dr. Cowan. It would therefore be inappropriate to use Mr. Holt's findings to calculate losses since Plaintiff's experts have not adequately established that Holt Material Defects have caused losses for the HSSL loans.

59. Further calling into question the reliability of Mr. Holt's re-underwriting results, I find evidence of inconsistent judgment being applied by Mr. Holt's re-underwriters. The underwriting and re-underwriting processes are inherently subjective. Mr. Holt acknowledges as much, writing that "underwriting involves an exercise of judgment."[75] Due to this subjectivity, the methodology by which loans are assigned to particular re-underwriters can have a substantial impact on the reliability of the re-underwriting exercise and ultimately the defect findings. Nonetheless, Mr. Holt omits from his Expert Report any description of how loans were assigned to re-underwriters. Mr. Holt merely states that he "assigned the loans to [his] team of re-underwriters for first-level re-underwriting."[76] In Mr. Holt's deposition, he describes an essentially random process for the assignment of loans to re-underwriters, stating "[m]y assistant… would just assign the loans out… there's no science to it."[77]

60. If loans were assigned randomly, and if the re-underwriters evaluated loans using consistent criteria, one would expect to find consistency in the defect rates across re-underwriters.[78] I do not find this to be the case. Rather, both before and after controlling

[75] Holt Report, p. 5.
[76] Holt Report, p. 15.
[77] Deposition of Ira Holt, Jr., June 11, 2013, p. 88.
[78] Some variation would be expected due to chance, but I would not expect those differences to be statistically significant.

for a variety of loan and borrower characteristics, I find statistically significant differences in the defect rates across the members of Mr. Holt's re-underwriting team. These findings highlight the subjectivity of the re-underwriting exercise and point to the unreliability of Mr. Holt's results.[79]

61. I was able to identify individual re-underwriters and the loans they reviewed using Mr. Holt's backup materials. According to Mr. Holt, the re-underwriting process involved a staff of 19 re-underwriters, including himself.[80] The number of loans reviewed by each of the 19 re-underwriters varies considerably, from 1 to 143 loans (*see* Exhibit 18). The defect rates across the re-underwriters range from zero percent to 100 percent. Considering only those re-underwriters who reviewed more than 30 loans, the defect rates range from 23.8 percent to 67.4 percent and the differences in these defect rates are statistically significant. If loan files were in fact assigned to re-underwriters randomly, these findings provide evidence of inconsistent judgment being applied by different re-underwriters.

62. In his deposition, Mr. Holt describes a quality control process in which he compared defect rates across re-underwriters.[81] While Mr. Holt testifies that the process of assigning loans to re-underwriters was essentially random,[82] he acknowledges that re-

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[79] Note that I find inconsistencies across re-underwriters even though Mr. Holt states that he "personally carried out quality control (or second-level review testing) on virtually all of the loans that were re-underwritten" and provided daily supervision of his re-underwriting team. [Holt Report, p. 15] When asked in his deposition how often he would change a recommendation made by a re-underwriter, Mr. Holt responded: "There wasn't much in the way of changes, no. More of the content of what was found." [Deposition of Ira Holt, Jr., June 11, 2013, pp. 326-327]

[80] Holt Report, p. 15. I identified the 19 different re-underwriters using the "UWID" variable in Mr. Holt's backup data. [2013.05.02 Final Data File.csv]

[81] "Q: Did you analyze the material defect rates that your other underwriters were reaching on the loans that they were reviewing? A: Yes. Part of the [Quality Control] is to see if everybody is coming up with similar responses or there's any deviations because they can go back to insuring [sic] that we're analyzing and understanding the guidelines correctly…" [Deposition of Ira Holt. Jr., June 11, 2013, p. 101]

[82] Deposition of Ira Holt, Jr., June 11, 2013, p. 88.

underwriters may have been assigned different types of loans and that this needs to be considered when comparing defect rates across re-underwriters.[83] If different re-underwriters reviewed loans with different characteristics (for example, if one re-underwriter was primarily assigned full documentation loans, while another was primarily assigned reduced documentation loans), one would not expect to find consistency in the *uncontrolled* defect rates across re-underwriters. Instead, one would expect to find consistency in the defect rates across re-underwriters after controlling for observable loan characteristics such as documentation type.

63. To evaluate the consistency of defect rates across re-underwriters controlling for observable loan characteristics, I estimate a regression model. The dependent variable is a defect indicator equal to one for Holt Materially Defective loans and equal to zero for Holt Non-Materially Defective loans. The control variables include a variety of borrower and loan characteristics (for example, CLTV ratio, FICO score, documentation type, loan purpose, property type, origination year, state), and an indicator variable for each re-underwriter. Given Plaintiff's claim that loans approved by loan specialists were more likely to be defective, I also include a variable indicating whether a loan was approved by a loan specialist as defined by Dr. McFadden.[84]

64. If the assignment of loans across re-underwriters varied based on any of the characteristics included in the regression model, one would expect to find no statistical difference in the estimated coefficients for the re-underwriter indicator variables. On the

[83] "[W]e look at what every underwriter is doing, but you also have to take it a step further and look at, okay, what type of loans did they get? What kind of doc types did they get?" [Deposition of Ira Holt, Jr., June 11, 2013, p. 101]
[84] Complaint, ¶¶ 76, 81. *See* Corrected McFadden Report, Appendix C: "The loan specialist review flag identifies loans in which the 'SM_PC3_Title' column from the loan database contains the phrase 'Loan Specialist'. The loan data glossary describes the 'SM_PC3_Title' column as 'Person who moved the loan from Phase Code 2 (approval) to Phase Code 3 (pre closing)'." Following this methodology, I consider a loan to have been reviewed by a loan specialist if the "SM_PC3_Title" variable in Dr. McFadden's data contains the phrase "Loan Specialist."

contrary, I find that the differences in the re-underwriter defect rates, controlling for the loan and borrower characteristics included in the model, are statistically significant. In particular, I test whether the estimated odds ratios on the re-underwriter indicator variables are equal (that is, whether the odds of finding a Material Defect are statistically different after controlling for loan and borrower characteristics). I find that they are not equal (*p*-value of zero) (*see* Exhibit 19). I also find that the estimated odds ratio on the "Loan Specialist" variable is less than one. Contrary to Plaintiff's claims, this indicates that, after controlling for various loan and borrower characteristics, loans approved by a loan specialist are *less* likely to be found Materially Defective by Mr. Holt than loans that were approved by an underwriter. However, this estimated odds ratio is not statistically significant (*p*-value of 0.26 in Model A and *p*-value of 0.44 in Model B).

65. Together with the absence of a statistically significant relationship between Holt Material Defects and loan performance, the evidence of inconsistent judgment being applied across re-underwriters further calls into question the reliability of Mr. Holt's defect findings. Dr. Cowan, Dr. McFadden, and Dr. Mason directly rely on Mr. Holt's re-underwriting findings in conducting their respective analyses. To the extent Mr. Holt's re-underwriting results are unreliable, the conclusions Dr. Cowan, Dr. McFadden, and Dr. Mason draw from these analyses may therefore also be unreliable and misleading.

C. Dr. McFadden's "scenario analysis" is flawed and misleading

66. Using the results from his logit regression, Dr. McFadden conducts a "scenario analysis" in which he purports to calculate the change in the number of seriously delinquent PHSSL loans in a counterfactual scenario. In this counterfactual scenario, he assumes PHSSL loans are neither defective (that is, have zero defects according to his defect

measure, which is the count of defects for each loan when only considering the five Agency Defects for which Dr. McFadden found a positive relationship with the probability of serious delinquency) nor approved by a loan specialist. Dr. McFadden claims that 2,773 PHSSL loans would not have become seriously delinquent had they not been defective and an additional 1,805 PHSSL loans would not have become seriously delinquent had they not been approved by a loan specialist, for a total serious delinquency count change of 4,668 PHSSL loans.[85] In his deposition, Dr. McFadden describes these results as "simply [giving] an indication that this elevated risk from these flaws was economically significant."[86] He goes on to say that "[i]f [he] were using these analysis [sic] for [his] own damage estimates… [he] would be concerned with how sensitive this is."[87]

67. In addition to McFadden's own caveats regarding the implications of his scenario analysis, his findings are misleading for other reasons. First, Dr. McFadden's scenario analysis suffers from the same issue described above. Instead of estimating the change in the number of seriously delinquent loans in the counterfactual scenario in which none of the loans have Holt Material Defects, Dr. McFadden instead estimates the change in the number of seriously delinquent loans based on his alternative defect measure. By construction, this alternative defect measure ensures a strong relationship is found between defects and the probability of serious delinquency. Second, Dr. McFadden's performance measure (ever 90 days delinquent) does not measure loans that ultimately

[85] Corrected McFadden Report, ¶ 27.
[86] Deposition of Dr. Daniel L. McFadden, June 11, 2013, p. 50.
[87] Deposition of Dr. Daniel L. McFadden, June 11, 2013, pp. 50-51.

result in a loss because not all loans that become 90 days delinquent remain delinquent or default.

IX. CONCLUSION

68. My findings undercut Plaintiff's allegations. Had the HSSL loans been originated using poorer underwriting standards than those used for non-HSSL loans or loans originated by other lenders, one would expect the loans to have experienced a higher level of default and serious delinquency. In fact, just the opposite is true. I find that HSSL loans have performed as well as or better than non-HSSL loans both before and after accounting for the disclosed characteristics of the loans and macroeconomic conditions. This conclusion holds regardless of whether I use Dr. McFadden's models or my own, and regardless of whether I use Plaintiff's definition of HSSL loans or the Entity Defendants' definition. In addition, I find that both PHSSL and DHSSL loans have performed better than comparable loans sold to the GSEs by all lenders, after controlling for disclosed loan characteristics and changes in macroeconomic conditions.

69. Not only is the performance of HSSL loans better than or on par with that of non-HSSL loans, but based on Mr. Holt's re-underwriting results, PHSSL loans have a *lower* defect rate than non-PHSSL loans. In addition, Plaintiff's experts have failed to establish that Holt Materially Defective loans have a higher probability of serious delinquency than Holt Non-Materially Defective loans at the statistical significance standard set by Plaintiff's expert, Dr. Cowan. Using Dr. McFadden's own models, I find, if anything, a marginally statistically significant relationship between Holt Material Defects and the probability of serious delinquency among all sample loans. For PHSSL loans in particular, I do not find a statistically significant relationship between Holt Material

Defects and the probability of serious delinquency. I also find evidence of inconsistencies in defect rates across re-underwriters after controlling for loan and borrower characteristics, further suggesting that Mr. Holt's re-underwriting results are unreliable. To the extent Mr. Holt's re-underwriting results are unreliable, the conclusions drawn by Plaintiff's other experts based on these findings are similarly unreliable.

R Glenn Hubbard

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Robert Glenn Hubbard

Exhibit B

Exhibit 17A
Modification of McFadden Table 7 Logit Model (1) to Include Material Defect
Plaintiff's Modified Definition of HSSL
08/23/13 Updated McFadden Report

Control Variables	Estimated Parameter		Std. Error	*p*-value
(Intercept)	5.295	***	1.900	0.005
PHSSL	-0.330		0.386	0.392
Material Defect	0.311		0.191	0.104
LoanFICOScore	-0.015	***	0.002	0.000
DTI	0.008		0.010	0.423
DTI > 50	0.614	**	0.294	0.037
CLTV	0.036	***	0.007	0.000
Loan Amount	0.002	*	0.001	0.060
HPI Growth	-4.173	**	1.634	0.011
Refinance	0.121		0.495	0.807
2-4 Units	2.430	**	1.192	0.041
Condominium	0.967	**	0.422	0.022
Planned Unit Development	0.096		0.313	0.760
Unknown	0.354		0.690	0.608
Alt	0.299		0.242	0.216
Fast And Easy	0.729	**	0.318	0.022
Fastrack	0.904	*	0.464	0.051
Other	0.290		0.801	0.718
Reduced	1.563	***	0.507	0.002
Investment	-0.329		0.452	0.467
Secondary Residence	-0.038		0.536	0.943
Number of Loans	857			

Notes:
[1] *** Statistically significant at 99 percent confidence level, ** statistically significant at 95 percent confidence level, * statistically significant at 90 percent confidence level.
[2] Similar to Table 7 in the Updated Expert Report of Daniel L. McFadden, August 23, 2013, this regression includes controls for fixed effects by State and by Origination Month.

Sources:
Updated Expert Report of Daniel L. McFadden, August 23, 2013 and related back-up materials.

Exhibit 17B
Modification of McFadden Table E2 Duration Model (1) to Include Material Defect
Plaintiff's Modified Definition of HSSL
08/23/13 Updated McFadden Report

Control Variables	**Estimated Parameter**		**Std. Error**	***p*-value**
(Intercept)	-2.756	**	1.352	0.042
PHSSL	0.096		0.152	0.527
Material Defect	0.195		0.137	0.155
LoanFICOScore	-0.014	***	0.002	0.000
DTI	0.008		0.008	0.315
DTI > 50	0.363	*	0.207	0.080
CLTV	0.032	***	0.006	0.000
Loan Amount	0.002	*	0.001	0.054
HPI Growth	-1.150	***	0.288	0.000
Refinance	0.198		0.310	0.523
2-4 Units	0.499		0.725	0.492
Condominium	0.880	***	0.287	0.002
Planned Unit Development	0.213		0.229	0.353
Unknown	-0.106		0.482	0.825
Alt	0.242		0.169	0.153
Fast And Easy	0.864	***	0.251	0.001
Fastrack	0.659	*	0.361	0.068
Other	0.096		0.551	0.862
Reduced	0.944	***	0.311	0.002
Investment	0.164		0.377	0.663
Secondary Residence	0.181		0.453	0.690
Number of Loans	857			

Notes:
[1] *** Statistically significant at 99 percent confidence level, ** statistically significant at 95 percent confidence level, * statistically significant at 90 percent confidence level.
[2] Similar to Table E2 in the Updated Expert Report of Daniel L. McFadden, August 23, 2013, this model includes controls for number of quarters elapsed and fixed effects by State.

Source:
Updated Expert Report of Daniel L. McFadden, August 23, 2013 and related back-up materials.

Exhibit 17C
Modification of McFadden Table 7 Logit Model (1)
to Include HSSL Material Defect and Non-HSSL Material Defect
08/23/13 Updated McFadden Report

Control Variables	**Estimated Parameter**		**Std. Error**	***p*-value**
(Intercept)	5.070	***	1.910	0.008
PHSSL	-0.046		0.426	0.914
PHSSL and Material Defect	-0.025		0.283	0.931
Non-PHSSL and Material Defect	0.588	**	0.258	0.023
LoanFICOScore	-0.015	***	0.002	0.000
DTI	0.009		0.010	0.383
DTI > 50	0.621	**	0.295	0.036
CLTV	0.037	***	0.007	0.000
Loan Amount	0.002	*	0.001	0.060
HPI Growth	-4.518	***	1.656	0.006
Refinance	0.181		0.500	0.718
2-4 Units	2.562	**	1.199	0.033
Condominium	0.995	**	0.423	0.019
Planned Unit Development	0.078		0.314	0.803
Unknown	0.384		0.700	0.583
Alt	0.277		0.243	0.254
Fast And Easy	0.756	**	0.318	0.017
Fastrack	0.842	*	0.465	0.070
Other	0.326		0.802	0.685
Reduced	1.561	***	0.506	0.002
Investment	-0.327		0.453	0.470
Secondary Residence	-0.045		0.534	0.932
Number of Loans	857			

Notes:
[1] *** Statistically significant at 99 percent confidence level, ** statistically significant at 95 percent confidence level, * statistically significant at 90 percent confidence level.
[2] Similar to Table 7 in the Updated Expert Report of Daniel L. McFadden, August 23, 2013, this regression includes controls for fixed effects by State and by Origination Month.

Sources:
Updated Expert Report of Daniel L. McFadden, August 23, 2013 and related back-up materials.

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Exhibit 17D
Modification of McFadden Table E2 Duration Model (1)
to Include HSSL Material Defect and Non-HSSL Material Defect Interactions
Plaintiff's Modified Definition of HSSL
08/23/13 Updated McFadden Report

Control Variables	Estimated Parameter		Std. Error	Z Score	*p* -value
(Intercept)	-2.844	**	1.358	-2.093	0.036
PHSSL	0.211		0.207	1.017	0.309
PHSSL and Material Defect	0.061		0.215	0.283	0.777
Non-PHSSL and Material Defect	0.282		0.174	1.624	0.104
LoanFICOScore	-0.014	***	0.002	-7.210	0.000
DTI	0.008		0.008	1.032	0.302
DTI > 50	0.370	*	0.207	1.782	0.075
CLTV	0.033	***	0.006	5.711	0.000
Loan Amount	0.002	*	0.001	1.926	0.054
HPI Growth	-1.159	***	0.288	-4.017	0.000
Refinance	0.196		0.311	0.630	0.528
2-4 Units	0.549		0.727	0.755	0.450
Condominium	0.877	***	0.286	3.068	0.002
Planned Unit Development	0.210		0.229	0.918	0.358
Unknown	-0.109		0.482	-0.226	0.821
Alt	0.231		0.170	1.360	0.174
Fast And Easy	0.858	***	0.251	3.421	0.001
Fastrack	0.641	*	0.361	1.774	0.076
Other	0.092		0.548	0.168	0.866
Reduced	0.928	***	0.310	2.992	0.003
Investment	0.155		0.376	0.413	0.680
Secondary Residence	0.169		0.452	0.374	0.708
Number of Loans	857				

Notes:

[1] *** Statistically significant at 99 percent confidence level, ** statistically significant at 95 percent confidence level, * statistically significant at 90 percent confidence level.

[2] Similar to Table E2 in the Updated Expert Report of Daniel L. McFadden, August 23, 2013, this model includes controls for number of quarters elapsed and fixed effects by State.

Source:

Updated Expert Report of Daniel L. McFadden, August 23, 2013 and related back-up materials.